



# THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE

## *Department of Forestry and Wood Technology*

### **FWT 305 – Principles of Silviculture**

#### **COURSE PARTICULARS**

**Course Code:** FWT 305

**Course Title:** Principles of silviculture

**No. of Units:** 3

**Course Duration:** Two hours of theory and three hours of practical per week for 15 weeks.

**Status:** Compulsory

**Prerequisite:** NIL

#### **COURSE INSTRUCTORS**

**Professor M.B Oyun**

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#### **COURSE DESCRIPTION**

The course is designed to teach students in Forestry and general agriculture to acquire knowledge on the principles that relates to tree growth and productivity. The contents of the course include introduction to the problems of raising tree crops; application of ecological principles for establishment and maintenance of tree plantation; tree seed collection and processing; seed testing, pre-treatment and storage; photosynthesis; water uptake and loss in a tree; nutrient cycling in forest ecosystem; principles underlying choice of species; species and provenance trials.

#### **COURSE OBJECTIVES**

The objective of this course is to make students acquire requisite knowledge on ecology, general practices and physiology of growth and productivity of tree crops.

## COURSE LEARNING OUTCOMES / COMPETENCIES

Upon successful completion of this course, the student will be able to:

- articulate the meaning and purpose of silviculture
- understand the problems of raising tree crops
- understand ecological factors that affect tree growth
- know how to collect and process tree seeds
- know how to test, pre-treat and store tree seeds
- understand the biochemistry of photosynthesis in nature
- have sound knowledge of water uptake and loss in a tree
- understand the process of nutrient cycling in forest ecosystem
- understand the principles underlying choice of species for plantation establishment

## GRADING SYSTEM FOR THE COURSE

This course will be graded as follows:

|                          |                    |
|--------------------------|--------------------|
| Field based practical    | 20%                |
| Test(s)                  | 20%                |
| <u>Final Examination</u> | <u>60%</u>         |
| <b><u>TOTAL</u></b>      | <b><u>100%</u></b> |

## GENERAL INSTRUCTIONS

**Attendance:** It is expected that every student will be in class for lectures and also participate in all practical exercises. Attendance records will be kept and used to determine each person's qualification to sit for the final examination. In case of illness or other unavoidable cause of absence, the student must report to me or the practical instructor indicating the reason for the absence.

**Academic Integrity:** Violations of academic integrity, including dishonesty in assignments, examinations, or other academic performances are prohibited. You are not allowed to make copies of another person's work and submit it as your own; that is plagiarism. All cases of academic dishonesty will be reported to the University Management for appropriate sanctions in accordance with the guidelines for handling students' misconduct as spelt out in the Students' Handbook.

**Assignments and Group Work:** Students are expected to submit assignments as scheduled. Failure to submit an assignment as at when due will earn you zero for that assignment. Only under extenuating circumstances, for which a student has notified any of the instructors in advance, will late submission of assignments be permitted.

**Code of Conduct in Lecture Rooms and Laboratories:** Students should turn off their cell phones during lectures. Students are prohibited from engaging in other activities (such as texting, watching videos, etc.) during lectures. Food and drinks are not permitted in the lecture rooms.

## READING LIST

<sup>1</sup>Julian Evans (1992). *Plantation Forestry in the tropics*. Clarendon press, Oxford. 403p

<sup>4</sup>Chris Palzer (2002). *Tree Nursery manual for Eritrea*. Sida's Regional Land Management Unit (RELMA). Technical hand book No. 26. 126p

<sup>1</sup> Katherine Moir et al (2007). *Growing trees and Gardens for life*. Jacaranda designs Ltd. Nairobi, Kenya. 87p

<sup>1</sup> Lincoln, T and Eduardo, Z (1991). *Plant physiology*. Benjamin/Cummings publishing company Inc. 565p

<sup>1</sup> Sven Gunter et al (2011). *Silviculture in the tropics*. Springer Heidelberg Dordrecht. London. New york 559p

<sup>2</sup>Delvin, R.M and Witham, F.H (1983). *Plant physiology*. Pws publishers 577p

<sup>2</sup>Steven H.S and Burton V.B (1980). *Forest Ecology*. John wiley&sons, Inc. 687p

### Legend

1- Available in the Departmental/School Libraries

2- Available in the University library

3- Available on the Internet.

4- Available as Personal Collection

## COURSE OUTLINE

| Week | Topic  | Remarks   |
|------|--|---|
| 1    | Definition and purpose of silviculture         | During this first class, the expectation of the students from the course will also be documented. |
|      | 1.Introduction to the problems of raising tree | The lecture on these topics will  |

|         |   |  |
|---------|---|--|
| 2 & 3   | <p>crops</p> <p>2. Ecological factors affecting tree growth</p> <ul style="list-style-type: none"> <li>* climatic factors</li> <li>- water</li> <li>- light</li> <li>- temperature</li> <li>- air movement (wind)</li> </ul>  | <p>enable the students to be aware of probable problems to be encountered in raising tree crops including the ability to solve such problems. Students will also have clear understanding on how climatic factors affect the growth of trees</p> |
| 4 & 5   | <p>Ecological factors affecting tree growth (contd)</p> <ul style="list-style-type: none"> <li>• Edaphic factor <ul style="list-style-type: none"> <li>- soil texture</li> <li>- soil structure</li> <li>- soil moisture</li> <li>- soil aeration</li> <li>- soil depth</li> <li>- organic matter</li> <li>- soil mineral nutrients</li> <li>- soil reaction or pH</li> <li>- nutrient cycle</li> </ul> </li> </ul> | <p>The lectures on these aspect of the course will indicate to the students how the listed edaphic factors influence tree growth</p>   |
| 6       | <p>Ecological factors influencing tree growth (contd)</p> <ul style="list-style-type: none"> <li>• Biotic factor <ul style="list-style-type: none"> <li>- competition</li> <li>- allelopathy</li> <li>- parasitism</li> </ul> </li> </ul>   | <p>The lecture will clearly indicate to the students the interaction of the different biotic factors during the growth of tree.</p>  |
| 7 & 8   | <p>Seed Technology</p> <ul style="list-style-type: none"> <li>• seed collection</li> <li>• seed processing</li> <li>• seed testing</li> <li>• seed pre-treatment methods</li> <li>• seed storage methods</li> </ul>   | <p>Students will be requested to work in groups in the field, nursery and laboratory to practically undertake the activities indicated</p>   |
|         |   | <p><b>MID-SEMESTER TEST</b></p>  |
| 9 & 10  | <p>Water uptake and loss in a tree</p> <ul style="list-style-type: none"> <li>• absorption</li> <li>• ascent of sap</li> <li>• water loss from plants (transpiration)</li> <li>• factors that influences transpiration</li> </ul>   | <p>The students will understand water absorption, ascent of water to the leaves and loss of water from plants.</p>   |
| 11 & 12 | <p>Nutrient cycling in Forest ecosystem</p> <ul style="list-style-type: none"> <li>• carbon cycle</li> <li>• nitrogen cycle</li> </ul>  | <p>Each student will be expected to draw carbon and nitrogen cycle in a named terrestrial ecosystem</p>  |

|         |  |  |
|---------|--|--|
|         |  |  |
| 13 & 14 | <p>Principles underlying choice of species</p> <ul style="list-style-type: none"> <li>• adaptation of the species to site</li> <li>• utility of the species for different purposes</li> <li>• availability of the species</li> </ul> <p>Species and provenance trial</p> <ul style="list-style-type: none"> <li>• species elimination trial</li> <li>• species growth trial</li> <li>• uniformity trial</li> <li>• provenance trial</li> </ul> | -  |
| 15      | REVISION   | This is the week preceding the final examination. At this time, evaluation will be done to assess how far the students' expectations for the course have been met. |